

Ammonia burns of the eye: an old weapon in new hands

The use of ammonia sprays in cases of criminal assault has recently increased in London. Victims are temporarily immobilised by ammonia solution squirted into their eyes. It causes intense discomfort. What is often not appreciated is that such injuries may permanently impair vision and even cause blindness. Immediate prolonged irrigation of the eyes with copious quantities of water is the most important aspect of management.¹

Twenty years ago ammonia was used commonly during payroll, bank, or security firm robberies. The introduction of protective eye wear for employees at risk may have contributed to a subsequent fall in these injuries. But at this west London eye hospital we saw two cases of ocular ammonia burns in 1985, 14 cases in 1986, and 35 cases in 1987. This increase has also been reported from Croydon eye unit.² The motive may be robbery, but sometimes there is no apparent reason for the attack.

The ammonia is squirted from a plastic container (often a Jif lemon juice container, which delivers a fine jet of fluid). The preparation used is probably household ammonia, which is freely available as a cleaning agent at up to a 9.5% solution, although commercial preparations range up to 35%. Ammonia causes one of the most serious ocular chemical burns. Its high lipid solubility allows diffusion through the cornea into the anterior chamber within a few seconds of injury,³ with subsequent damage to the cornea, lens, drainage system, and even the retina.⁴

Immediate first aid with thorough and prolonged irrigation of the affected eyes with water is essential.¹ Any delay is likely to increase ocular damage.⁵ Medical treatment should start with further irrigation (with universal buffer if available) for 30 minutes or longer until the eye reaches neutral pH as tested in the conjunctival sac.

Cursory examination of the eye may show some erythema of the lids and minimal ocular injection because of blanching of the conjunctival vessels. The serious nature of the injury may be missed. Fluorescein staining of the cornea is needed to show the extent of epithelial loss, and examination with a slit lamp is mandatory. Corneal stromal damage, conjunctival and episcleral ischaemia, and the extent of intraocular inflammation must be recorded to assess the needs for treatment and the long term prognosis.^{6,7}

Minor damage with little epithelial loss can be treated with topical antibiotics. Patients with more serious burns usually require admission to hospital for intensive treatment with topical steroids and ascorbate drops. The ascorbate reduces the incidence of corneal perforation in rabbits.⁸ It may act by scavenging and therefore reducing the effect of toxic free superoxide radicals released by neutrophils and by reversing the aqueous vitamin C depletion that may be measured up to four weeks after the injury.⁹

Healing is often accompanied by progressive scarring and vascularisation of the cornea with further deterioration of vision; some eyes become hypotonic because of ciliary body damage, whereas others develop secondary glaucoma. Conjunctival damage may lead to symblepharon (adhesion of the eyelids to the eyeball), and diffuse loss of conjunctival goblet cells leads to a poor tear film. This poor film is one of several factors that makes these patients poor candidates for corneal grafting. Over the past three years, five of our patients have lost the sight of one eye, and one patient is registered blind because of severe bilateral ammonia burns.

Further efforts must be made to reduce these attacks. The terrible consequences of the attack may not be apparent to the assailants. Harsher penalties for those convicted of these assaults or of possessing ammonia sprays may be needed to stop this epidemic.

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A better deal for senior house officers

Senior house officers are the largest group on the medical career ladder. They contribute much to the National Health Service, and yet, suggests a recent report from the Council for Postgraduate Medical Education in England and Wales, they do not get much in return.¹ Senior house officers are contracted to work 86 hours a week but receive less than two hours of formal education, which, says the report, is not nearly sufficient. The balance between service and training has evolved haphazardly, and now is the time to plan a better structure.

The report dismisses the canard that senior house officers can learn properly only by being on the job round the clock. The service commitment is now so great that few opportunities exist for more formal study, and exhausted senior house officers are not capable of obtaining full benefit from their experiences. Furthermore, since doctors now spend longer in junior posts it is no longer true that hours must be long to provide the required experience. Indeed, many senior house officers judge much of their working week to be spent on tasks that do not need their skills and provide no opportunity for learning. The report calls for a detailed study of the senior house officers' working week so that a proper balance between training, service, and education can be achieved. This would also help to identify tasks that would be better performed by other people, including consultants. Many jobs often done by senior house officers could, although the report does not say so, be done by nurses or ward clerks if sufficient numbers of them were employed.

Another difficulty for senior house officers is that they spend so much time canvassing for their next job and covering their colleagues' annual leave. The report calls for contracts for senior house officers to be for two years, which would allow better planning of the balance between service and training. Some specialties inevitably mean more routine work for the senior house officer, but these should be balanced by jobs where more time can be spent on study. A structured programme over two years would ensure that